

REMARKS

The Office action dated March 18, 2008, and the references cited therein have been received and carefully reviewed.

The objection to the drawings is traversed by appropriate amendment.

Specifically, the specification has been amended to include the attached FIG. 7. No new matter has been added.

Applicants assert that support for the subject matter of FIG. 7 can be found in the following paragraphs of the specification (emphasis added):

[0022]

The sensor 41 is operable to output signals in response to the direction of the magnetic field lines of the magnetic field that intersects the sensor 41. More specifically, the output signals may vary linearly with a change in the direction of the magnetic field lines. In other words, the output signals may vary in proportion to the change of the direction of the magnetic field lines. For example, the sensor device 41 may be an IC that utilizes a magnetic resistance element.

[0033]

As the magnets 20 and 30, as well as the yoke 10 attached to the housing 2, rotate as the rotary shaft 3 rotates, the direction of the magnetic field lines intersecting the sensor 41 change in response to the rotational angle of the rotary shaft 3. Correspondingly, the output signal from the sensor 41 changes along with the rotational angle of the rotary shaft 3. A control unit, e.g., a CPU (not shown), receives the output signal from the sensor 41 and calculates the rotational angle of the rotary shaft 3 based upon the output signal. However, the sensor 41 may have a self-contained control unit in order to calculate the rotational angle of the rotary shaft 3.

Accordingly, entry of FIG. 7 into the application and favorable reconsideration of the objection to the drawings are respectfully urged.

As a result of the final Office Action, claims 27-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (US 5,544,000), hereinafter "Suzuki", in view of Hamaoka (US 6,483,296), hereinafter "Hamaoka '296".

The Patent Office has stated (page 6, lines 2 to 8 of the Office action) that:

"it would have been obvious at the time the invention was made to use magnetoresistive sensors in the integrated circuit of Suzuki in lieu of the Hall elements as taught by Hamaoka. One having ordinary skill in the art would do so because as noted in Hamaoka, such magnetoresistive sensors use a(re) usable in place of Hall elements in rotational positions sensors (See Hamaoka col. 17, lines 9-18)."

It is Applicants' position that the cited references do not disclose or suggest Applicants' invention as now claimed, and favorable reconsideration and allowance of the pending claims is therefore respectfully requested in view of the following remarks.

Firstly, in the arrangement of Hamaoka '296, stator cores 25 are disposed on opposite sides of a pair of Hall ICs 31. The stator cores 25 serves to increase the strength of the magnetic field intensity, while they prevent the change of

direction of the magnetic field across the Hall ICs 31. In other words, in Hamaoka, the magnetic field across the Hall ICs is produced only in a direction indicated by the outline arrow shown in FIG. 3 of the attached copy of the drawing.

Therefore, simply replacing Hall ICs of Hamaoka '296 with magnetoresistive elements would not achieve the claimed invention, which requires the magnetoresistive element be used for detecting the change of direction of the magnetic field.

Furthermore, the circuit 27 of Suzuki referred to in the Office action as an integrated circuit (see page 5, lines 2 to 6 in the Office Action) is not, in fact, an integrated circuit. As shown in FIGS. 5-7 of Suzuki, the element 27 is a printed circuit board to which sensors 8a and 8b are mounted. Clearly, Suzuki does not teach the IC as claimed in the present invention.

As the Applicants have previously stated, their arrangement of the sensor allows the device to have a small size, which is particularly advantageous when the device is mounted within the narrow confines of an automobile. It follows that the use of an undesirable separate large-sized electric circuit as described in Suzuki can be avoided by Applicants' invention. Furthermore, the IC configuration of the presently claimed invention also is advantageous in that

it enables manufacturing costs to be reduced.

That being said, in order to more clearly distinguish the claimed invention over Suzuki, independent claims 27 and 30-34 have been amended to recite the limitations that *"the detecting device includes a stationary support member having a first end and a second end; wherein the first end is fixed in position; wherein the second end is configured as a free end; and wherein the IC is positioned proximal to the second end of the support member"*.

Such limitations are also present in new claim 38.

In particular, these limitations clearly distinguish the present invention over Suzuki et al., because the control unit in Suzuki et al. is provided on a printed circuit board. In the claimed invention, however, the IC comprising the magnetoresistive elements and the control unit is positioned proximal to the second end of the support member. Therefore, no separate circuit board for the control unit is required in Applicants' invention.


Accordingly, since Hamaoka '296 and Suzuki fail to disclose or suggest every limitation of independent claims 27, 30-34, and 38, and claims dependent thereon, it is believed that the rejection under 35 U.S.C. 103(a) is unsustainable and should be favorably reconsidered and withdrawn.

Finally, the Applicants wish to point out the following with regard to US 6,198,276 (Konno) and US 5,998,989 (Lohberg), which were cited in the Office action as being pertinent to the Applicants' disclosure. The magnetoresistive elements of US 6,198,276 and US 5,998,989 both relate to techniques for detecting the presence of the magnetic field produced by a movable magnetic material and to counting the number of times the presence of the magnetic field is detected. These patents do not teach the use of the magnetoresistive element for detecting the direction of the magnetic field.

Applicants submit that the application is now in condition for allowance, and an early notice to that effect is earnestly solicited. If any issues remain that can be clarified by telephone, Examiner Whittington is encouraged to contact Applicants' Representative at the number indicated below.

Respectfully submitted,
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Date: June 17, 2008